# U.S. GROUND FORCES AND THE CONVENTIONAL BALANCE IN EUROPE

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## NOTES

Unless otherwise indicated, all years referred to in this report are fiscal years.

Unless otherwise indicated, all dollar amounts reflect budget authority in constant fiscal year 1989 dollars.

Details in the text, tables, and figures of this report may not add to totals because of rounding.

## PREFACE

The conventional balance in Europe between the forces of the North Atlantic Treaty Organization and the Warsaw Pact has been the topic of widespread debate since the two alliances were formed shortly after World War II. The recent agreement between the United States and the Soviet Union to eliminate the entire class of intermediate-range nuclear weapons has focused attention on the relative standing of the conventional forces that remain in Europe. Many suggestions have been made in recent years as to how to improve NATO's standing in relation to the Warsaw Pact, including numerous proposals for increasing the capability of NATO's ground forces. Yet the Congress, faced with budgetary constraints, must consider the cost of those options as well as their benefits. This study by the Congressional Budget Office, performed at the request of the House Committee on Armed Services, first assesses the current standing of NATO relative to the Warsaw Pact, with emphasis on each alliance's ground forces. The study then examines both the benefits and the costs of alternatives for improving the capability of NATO's ground forces. In keeping with CBO's mandate to provide objective analysis, the study does not recommend any particular course of action.

Frances M. Lussier of CBO's National Security Division prepared the study with the extensive assistance of Elizabeth A. Chambers and under the general supervision of Robert F. Hale and John D. Mayer, Jr. William P. Myers and Raymond J. Hall of CBO's Budget Analysis Division assisted with the cost analysis included in the study. The author gratefully acknowledges the helpful suggestions provided by Roberton Williams and Jeffrey A. Merkley of CBO and Dr. James R. Blaker of the Hudson Institute. (The assistance of external participants implies no responsibility for the final product, which rests solely with CBO.) Sherry Snyder edited the report, and Rebecca Kees and Kathryn Quattrone prepared it for publication.

James L. Blum
Acting Director

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## SUMMARY

Deterrence of war in Europe--or, if necessary, its successful prosecution--is a key goal of U.S. defense strategy. Achieving that goal depends in part on the balance of conventional forces between the United States and its allies in the North Atlantic Treaty Organization (NATO) and the Soviet Union and its Warsaw Pact allies. (Conventional forces include all military forces other than those employing nuclear weapons.)

Assessments of the conventional balance of military forces in Europe depend on many highly uncertain assumptions. Adding to the uncertainty is the contribution of nuclear weapons, which are thought to deter both sides from starting a war. Uncertainties notwithstanding, the Warsaw Pact has more weapons than NATO, particularly more heavy weapons like tanks. NATO's conventional forces also suffer important vulnerabilities. Some analysts believe those vulnerabilities will be heightened after intermediate-range nuclear forces (INF) have been eliminated under the terms of the recently enacted treaty or if long-range nuclear weapons are reduced under future treaties.

These concerns have led to proposals for improving NATO's conventional military capability. The improvements could cost tens of billions of dollars, a matter of concern in this period of fiscal restraint. Thus, it is important to understand how much such improvements would add to costs and capability, and to determine the status of the conventional balance of forces that these proposals seek to alter.

## ANALYTIC METHOD AND ITS LIMITATIONS

This study assesses the balance of conventional ground forces and options to alter that balance by using, as a primary measure, a technique known as the WEI/WUV method (for weapon effectiveness indices/weighted unit values). This technique accounts not only for the quantity of weapons but also their quality and judgments about the

importance of each type of weapon in ground combat. The WEI/WUV method computes the capability of each type of ground-combat unit relative to the capability of a U.S. armored division. These measures of capability can then be summed for all the forces on each side to produce a ratio of Warsaw Pact forces to NATO forces. A ratio of greater than one suggests an advantage for the Pact and vice versa.

Like all such techniques, the WEI/WUV method has important limitations. First, the method can only be used to evaluate the "static" balance--that is, it cannot, without extensive modification, take into account factors that affect the conduct of war, such as losses of weapons or personnel. Rather, it is useful for assessing the relative position of two forces before a war starts. Second, it evaluates the contribution of weapons but not support equipment. Third, the WEI/WUV method cannot quantify such intangibles as training, morale, or leadership. Finally, it does not incorporate the potential contributions of tactical aircraft to either side's capability. The method's inability to capture the contributions of NATO's support forces and tactical aircraft may understate NATO's capability relative to that of the Warsaw Pact. NATO invests more heavily in support equipment and personnel than does the Pact, and NATO's aircraft and pilots are generally thought to be more capable than their Pact counterparts.

As a secondary measure used primarily to assess the impact of several options for improving NATO's ground forces, this study relied on a dynamic method developed by Joshua Epstein of the Brookings Institution. Epstein's model attempts to simulate the loss of both forces and territory during the conduct of war. A dynamic analysis of the actual conduct of war was particularly important for assessing some of the options for improvement that are designed to alter the course of combat. Like the static method, Epstein's model does not capture the contribution of support equipment; nor can it account for either side's morale, leadership, or training. It does, however, attempt to simulate the contribution to the ground war made by each side's tactical aircraft.

## CONVENTIONAL BALANCE OF MILITARY FORCES

Because of the limitations of all analytic methods, any comprehensive assessment of the balance of military forces in Europe involves military judgment. This study, however, cannot offer such an assessment. Instead, it provides perspective by analyzing the balance of ground forces in Europe's central region under a variety of assumptions. (The central region is normally assumed to include the Federal Republic of Germany, the German Democratic Republic, Belgium, the Netherlands, Luxembourg, Poland, and Czechoslovakia.) Three sets of assumptions, outlining three cases, formed a basis for this study:

- Assumptions Favorable to NATO (Case 1). The amount of time NATO takes to respond to a Warsaw Pact mobilization for war is critical. Under the most favorable circumstances, NATO begins its mobilization without delay. Who mobilizes and fights is also important. Again, the most favorable assumptions would have all the NATO allies, including France, mobilize and fight immediately; Poland and Czechoslovakia, two Pact allies, would not mobilize at all. Finally, this case assumes that the least prepared Soviet divisions take a long time--up to 90 days--to become fully operational.

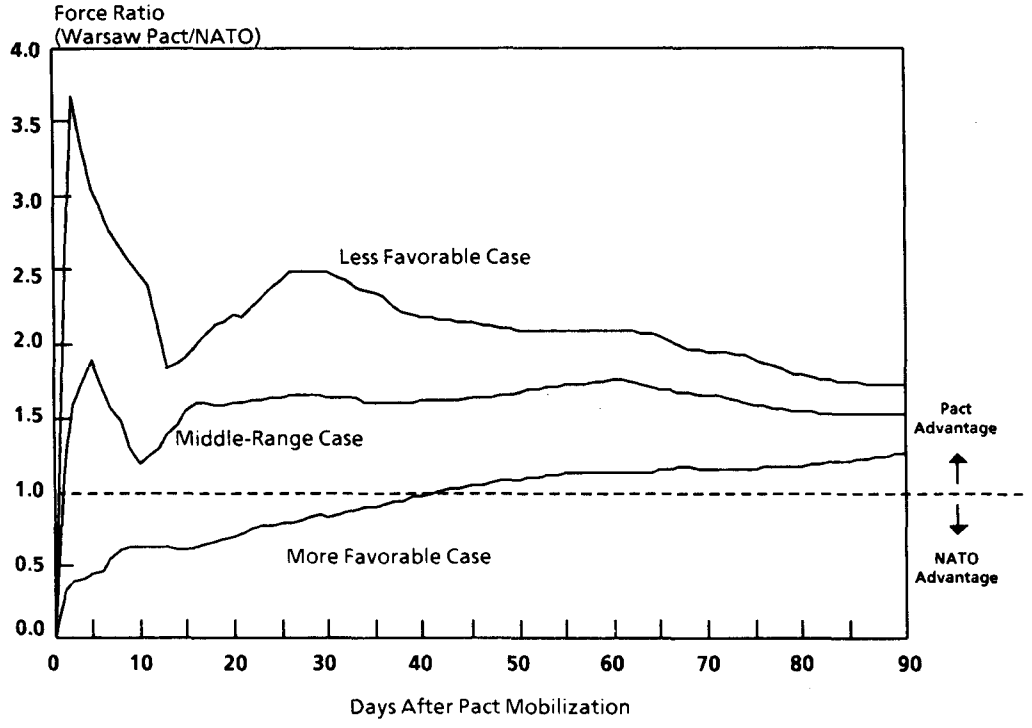
- Assumptions Less Favorable to NATO (Case 2). Any delay in responding to a Pact mobilization favors the Warsaw Pact and thus is less favorable for NATO. This case assumes that it takes a full week for NATO to respond. Also, it assumes that France chooses not to mobilize, but the Soviet allies, Poland and Czechoslovakia, participate. Finally, this case assumes that the least prepared Soviet divisions require only 25 days to become operational.

- Middle Range of Assumptions (Case 3). This case assumes that NATO does not respond immediately to Pact mobilization but does so four days later. Furthermore, in this case all allies on both sides would mobilize, including France for NATO and Poland and Czechoslovakia for the Warsaw Pact. Finally, it assumes that all of the least prepared Soviet divisions can become operational within 60 days.

## Results

The ratios that result from the WEI/WUV analysis of the balance vary widely (see Summary Figure 1). Under assumptions favorable to NATO, the ratios never exceed 1.3 within the 90 days following Pact mobilization. Under assumptions less favorable to NATO, the ratio initially reaches a high value--above 3.7--two days after mobilization and always exceeds 1.7 throughout the 90 days following Pact mobilization. In the middle-range case, the ratio varies between 1.5 and 1.7 following the first 15 days after mobilization.

Summary Figure 1.
Force Ratios in the European Central Region




SOURCE: Congressional Budget Office based on Department of Defense data and on William P. Mako, *U.S. Ground Forces and the Defense of Central Europe* (Washington, D.C.: Brookings Institution, 1983).

What significance can be attributed to these ratios? They cannot be used to predict who will win or lose. The preceding discussion of the shortcomings of the static method underlines the many important factors that are not taken into account. Rather, the ratios that result from the analysis can be used to identify those conditions under which NATO might be at risk.

NATO assumes that the Warsaw Pact will be the attacker. Many defense experts feel that an attacker must attain a ratio of 3 to 1 or 4 to 1 or more in a local area in order to overwhelm the defender, who has the advantage of selecting the point to defend. There is less agreement about the theaterwide ratios necessary to achieve such a localized ratio. Maximum theaterwide ratios that experts believe will not exceed NATO's ability to repel an invasion fall, for the most part, between 1.2 and 2.0.

By this standard, the assumptions favorable to NATO (Case 1) show NATO in a strong position relative to the Warsaw Pact. The results under assumptions less favorable to NATO (Case 2) look bleak. The ratios resulting from the middle-range assumptions (Case 3), which have been used in studies conducted by the Department of Defense in the past, show an advantage for the Warsaw Pact. But the ratios in this last case hover within the range of values that suggest a stalemate. Moreover, the wide range of outcomes represented by all three cases, coupled with the impossibility of knowing which assumptions would materialize in a conflict, suggest that neither side could be confident of victory in the event of war.

Nonetheless, NATO's conventional defenses have some vulnerabilities. NATO's defensive capabilities are not evenly spread over the central region of Europe. For example, the northern part of this region is defended by countries whose units, compared with those of the United States and some other allies, are equipped with fewer and, in some cases, less capable weapons. If the Warsaw Pact concentrated its superior numbers of well-equipped units in one of NATO's more vulnerable sectors, the force ratios would be of concern. For example, even under the middle range of assumptions, ratios in some northern areas could exceed 3, which might encourage the Pact to attack. A breakthrough by Warsaw Pact forces in one geographic area could jeopardize the defense of all of NATO.

Thus, NATO may need to improve its theaterwide forces, or at least avoid any decline, to increase confidence that it could deter the Warsaw Pact from attacking. More important, NATO would be strengthened if it shored up some of its weaker sectors.

## ALTERNATIVES FOR IMPROVING THE BALANCE OF CONVENTIONAL GROUND FORCES

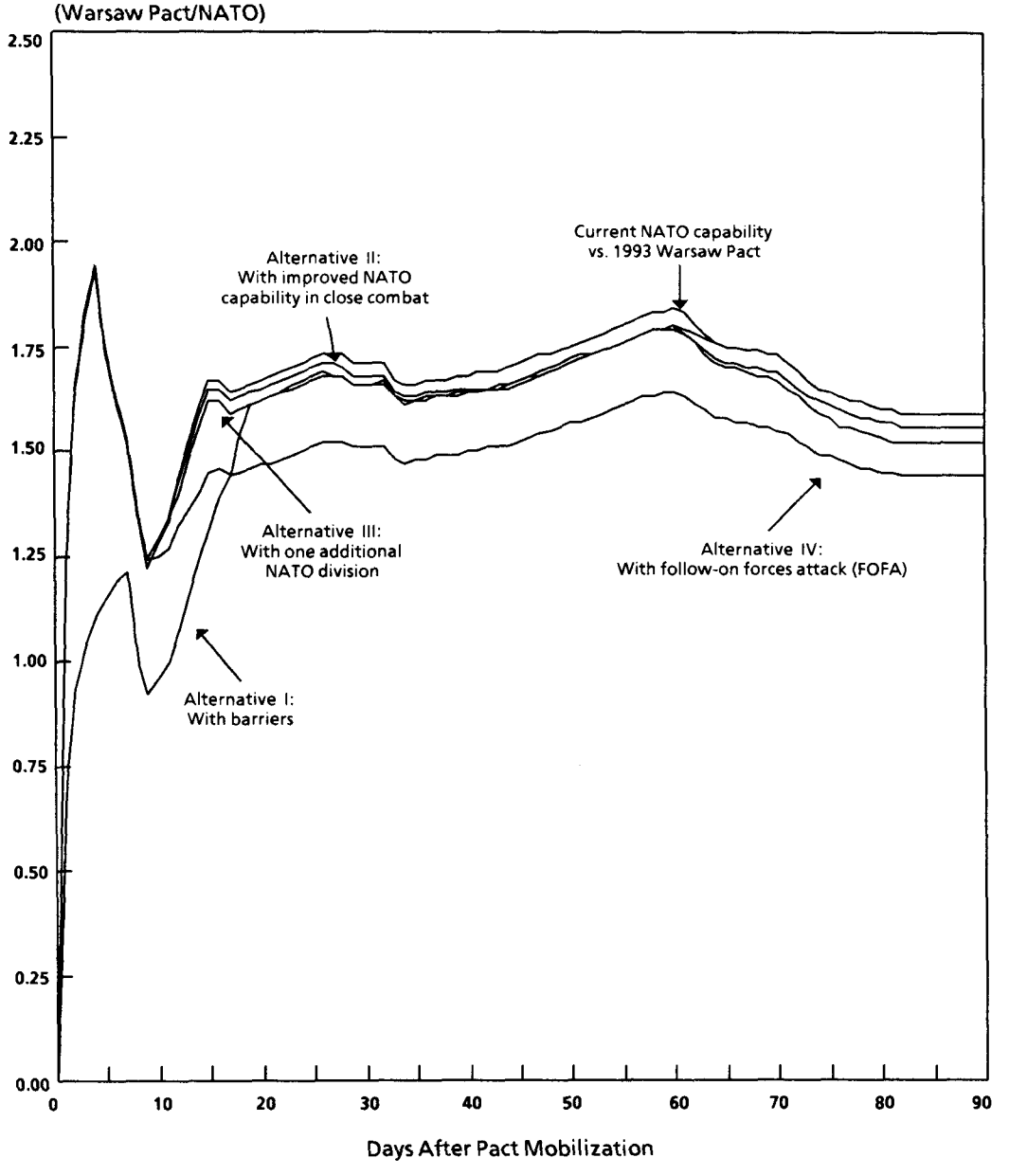
This study analyzed four alternatives for improving the capability of NATO's ground forces. The first three options would improve capability in the early 1990s, whereas the fourth would require longer-term investment and probably not improve NATO's capability until the end of the next decade at the earliest. Only those options that could be carried out by the United States alone, or with minimal investment by NATO allies, were considered since the United States cannot control investments made by its allies.

### Alternative I: Construct Barriers Along the Inter-German Border

This alternative examines the benefits that could accrue to NATO from erecting barriers along the inter-German border to slow a Pact attack. Barriers could include steep slopes planted with trees, or ditches created in time of war by detonating previously buried pipes filled with explosives. Although such barriers will not stop a Pact invasion, they could slow the advancing troops enough to provide NATO with precious time to position its forces throughout the theater and to bring up reinforcements.

The quantitative effects of such barriers are difficult to assess, particularly using a static measure like the WEI/WUV method. Both the static and dynamic analyses suggest, however, that barriers would have their greatest effect in the first few days after mobilization, possibly reducing the Pact/NATO force ratio by 20 percent at a point 10 days after Pact mobilization. (Analysis of the alternatives' effects, which is shown in Summary Figure 2, always uses the middle range of assumptions discussed above.) An advantage of this alternative is that estimates of costs are relatively low--ranging from $700 million

## Summary Figure 2.
## Comparison of Force Ratios Under Four Alternatives for Improving NATO Conventional Ground Forces




SOURCE: Congressional Budget Office based on Department of Defense data; John C.F. Tillson IV, "The Forward Defense of Europe," *Military Review* (May 1981), p. 66; and Office of Technology Assessment, *New Technology for NATO: Implementing Follow-On Forces Attack* (OTA-ISC-309, June 1987).

to $5 billion, depending on the extent of the defensive barrier and support network (see Summary Table 1). Political costs could be higher, however, since barriers raise environmental concerns and also emphasize the existence of two German nations.

## Alternative II: Improve NATO's Capability in Close Combat

NATO's overall military capability could be enhanced by providing U.S. forces with the most modern and sophisticated weapons for ground combat currently available. This alternative would buy, among other things, more M1A1 tanks, Bradley fighting vehicles, Apache attack helicopters, and Multiple Launch Rocket Systems. The total cost of implementing such a program, including acquisition and operating costs through the year 2008, could be as high as $48 billion.

SUMMARY TABLE 1. TOTAL COSTS OF ALTERNATIVES FOR IMPROVING NATO CONVENTIONAL GROUND FORCES (Costs in billions of fiscal year 1989 dollars of budget authority)

| | 1989 | 1990 | 1991 | 1992 | 1993 | Subtotal 1989-1993 | 1994-2008 | Total 1989-2008 |
|---|---|---|---|---|---|---|---|---|
| | | | | **Near Term** | | | | |
| Alternative I: Add Barriers | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 5.0 | 0.0 | 5.0 |
| Alternative II: Improve Close-Combat Capability | 4.6 | 5.9 | 7.4 | 6.9 | 4.5 | 29.4 | 19.1 | 48.4 |
| Alternative III: Add One Division | 5.0 | 4.5 | 1.8 | 1.8 | 1.8 | 14.8 | 26.4 | 41.2 |
| | | | | **Long Term** | | | | |
| Alternative IV: Emphasize Follow-On Forces Attack | 0.6 | 0.8 | 0.9 | 1.1 | 2.4 | 5.7 | 44.0 | 49.7 |

SOURCE: Derived by the Congressional Budget Office based on data included in Department of Defense publications; John C. F. Tillson IV, "The Forward Defense of Europe," *Military Review* (May 1981), p. 66; Institute for Defense Analyses, *Follow-On Force Attack*, R-302, vol. V (Alexandria, Va.: IDA, April 1986); and Department of the Army, U.S. Army Concepts Analysis Agency, *Forward of the FEBA Weapon System Cost and Benefit Study (FOFEBA), Phase I*, CAA-SR-81-3 (February 1981).

Purchase of improved equipment for U.S. forces would result in only a 2 percent reduction in the theaterwide force ratio. This relatively small improvement is partly a result of the Army's recent modernization effort, which has already improved many of the U.S. forces that would fight in a European war. Also, since this alternative involves changes only in U.S. forces, which provide roughly half of NATO's total combat units, the effect is diluted. Nor would this approach augment NATO's more vulnerable units to any greater degree, since the improvements would occur in the relatively stronger U.S. forces.

The Administration and the Congress may well pursue this option in order to keep open weapons production lines that would be important in wartime and to increase the capability of selected units that contribute heavily in the later months of a European war. But this approach would not significantly enhance the conventional balance in the key initial months.

### Alternative III: Add Forces to NATO

Rather than replace some of its weapons with more modern versions, NATO could improve its conventional capability by adding more ground forces. Having more NATO divisions could alter the conventional balance in Europe in NATO's favor. Because it is not possible to ascertain precisely how many additional forces would deter a Warsaw Pact attack, this alternative would add one division to the U.S. active forces--the most that could be equipped and supported for roughly the same cost incurred under the previous alternative.

This study's methods show that, for equal cost, investing in an additional division has about the same effect on the Pact/NATO balance as modernizing existing divisions. Specifically, this alternative would reduce the Pact/NATO force ratio by 2 percent 60 days after the Pact mobilizes--the same improvement that resulted from the previous alternative. While both alternatives involve roughly the same costs, this alternative would require the addition of at least 16,000 personnel to the active Army. Such an addition would run counter to current U.S. Army plans, which call for reductions in the number of personnel and units.